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Torch Plan Promoting High-Tech Industry

40100046A Beijing CHINA DAILY in English
23 Apr 90 p 3

[Text] (XINHUA)—Since it was first implemented in August 1988, the "Torch" plan has created favourable conditions for the development of high technology in China by establishing high-tech development zones and carrying out various projects.

"Torch" plan, administered by the State Science and Technology Commission, is designed to find practical applications for research findings, thus promoting high technology industries in China.

According to Shi Dinghuan, a programme official, over 30 high-tech development zones have been set up throughout the country based on the "Torch" plan.

According to statistics from 15 cities, including Beijing, Wuhan, Nanjing and Shenyang, the 2,065 high technology enterprises approved by the State produced a total output value of 2.62 billion yuan (\$556 million), and the total value of their exports in 1989 was over \$45 million. The official said, 25 high technology development service centres have been established in Shenyang, Harbin, Beijing and other cities using foreign experience in supporting small high-tech enterprises.

In 1988 and 1989, he said, the commission approved 283 State-level "Torch" projects, 70 per cent of which were carried out by research institutes, colleges and universities in partnership with enterprises.

These projects have "good market prospect and high efficiency," the official said.

The official said, the total investment in these projects was 1.5 billion yuan (\$319 million), and their estimated annual output value is 5.6 billion yuan (\$1.2 billion) and annual export value \$580 million.

He said the programme has aroused the interest of some foreign countries, which have expressed intentions of co-operating with China.

According to the official, the "Torch" plan obtained loans totalling over 200 million yuan (\$42 million) and \$10 million from the Industrial and Commercial Bank of China in 1988 and 1989.

Legal Protections Set for Software

40100047B Beijing CHINA DAILY in English
24 Apr 90 p 4

[Text] The Chinese government has always attached importance to the protection of intellectual property and is increasing its legislative efforts in this area, an official from the Ministry of Foreign Economic Relations and Trade (Mofert) has said.

Yuan Zhenmin, director of the Treaties and Laws Department of Mofert, made the remark in an interview which was carried on the front page of Friday's INTERNATIONAL BUSINESS.

According to Yuan, the State Council had already examined China's draft copyright law and submitted it to the National People's Congress Standing Committee in December last year for further deliberation.

Although the draft law applies to the protection of computer software, Yuan said, China plans to make a set of special regulations to protect computer software which has characteristics of its own.

He said that an amendment to the patent law is being drafted. China's patent system has been practiced for only five years, and it is impractical to expect it to be as complete as those of developed countries in such a short period of time, Yuan said.

Judging from China's conditions and the development of such legislation in other parts of the world, Yuan noted, the process of drafting legislation to protect and regulate intellectual property rights has been much quicker in China than in other countries.

He said that the United States knows about China's progress in the protection of intellectual property, since the two countries have held several consultations over the issue.

"I hope both countries increase their mutual understanding and trust so as to facilitate bilateral economic, trade and technological co-operation," Yuan added.

According to him, China has drawn up several laws since 1979 to grant legal protection over trademarks, patent rights and commercial secrets.

Besides, China has tried to link its domestic legislation with common international practice by participating in such international bodies as the World Intellectual Property Organization, the Paris Convention for the Protection of Industrial Property and the Madrid Agreement for International Registration of Trademarks.

Products and technologies that do not enjoy the protection of China's patent law are protected through contract terms, Yuan said. (XINHUA)

High-tech Association Established in Tianjin

40100047C Beijing CHINA DAILY in English
26 Apr 90 p 2

[Text] Tianjin (XINHUA)—A high-tech enterprise association, the first of its kind in China, was set up recently in Tianjin's new-technology industrial park.

The association will play a vital role in promoting the development of new high technologies in this coastal port city, said association president Yu Guozong, also a member of the Standing Committee of the Chinese

People's Political Consultative Conference and the Central Committee of the China Association for Promoting Democracy.

Yu said the aim of the association is to safeguard the interests of high-tech enterprises, to promote the development of high technologies, to turn scientific and technological research results into commodities and to organize domestic and international academic exchanges.

The park, established in 1988, has developed more than 100 high-tech enterprises and has made 800 scientific and technological discoveries, 87 of which have won ministerial and municipal level awards during the past year.

According to Yu, scientists and technicians from Hong Kong, Taiwan, Macao and foreign countries may join the association.

State Comes to Aid of Science Industry

40100047A Beijing CHINA DAILY in English
24 Apr 90 p 1

[Article by Zhang Yu'an]

[Text] Governor of the People's Bank of China yesterday announced a two-pronged plan to support the development of China's science and technology industry.

Li Guixian said the State "will gradually increase the ratio of loans for high technology development in the country's total credit funds distribution plan."

This, he said, would accompany efforts to raise investment in science and technology and thus reap improved results.

And to co-ordinate the plan, he said, the State had opened a special loan item in its comprehensive credit plan, called "the loan for scientific and technological development."

Li said financial institutions should support, after selection, the development of China's high technology, new technology and large-sized scientific and technological enterprises groups.

This was regarded as an important move by the State to promote economic development by means of combining finance with science and technology.

Li, also a State councilor, made these remarks at a prize-giving conference for the First National Results Show of Loans for the Development of Science and Technology.

The week-long show, opened yesterday at the Military Museum in Beijing, is co-organized by the State Commission of Science and Technology (SCST) and the Industrial and Commercial Bank of China (ICBC).

ICBC took the lead about five years ago in China in opening a special loan for the development of the country's science and technology.

By the end of last year the bank had granted a total of 6.64 billion yuan (\$1.41 billion) in loans to more than 20,000 science and technology development projects.

Favorable Rules Published for Caohejing High-Tech Zone

40100046b Beijing CHINA DAILY (Shanghai Focus)
in English 23 Apr 90 p 2

[Text] High-tech and new technology projects set up in Shanghai's Caohejing hi-tech development zone will enjoy various preferential terms, according to provisional regulations governing the zone just published here.

According to the regulations adopted by the 17th session of the 9th Shanghai People's Congress Standing Committee, the preferential terms include:

- High-tech enterprises will pay income tax at a rate of 15 percent;
- Bonded warehouses and factories can be set up in the zone with approval from the customs;
- High-tech enterprises can keep all their foreign exchange earnings during the first three years of operation and 80 percent of the hard currency they earn beginning from the fourth year, and
- Banks will provide preferential loans to the enterprises.

The five square kilometres zone, designed primarily for overseas investors, has improved its infrastructure and created a favorable investment environment since it was set up in 1988.

To date, 14 foreign-funded enterprises, with a total investment of \$191 million, have been set up in the zone.

The zone produces high-tech products such as precision instruments, computer software and integrated circuits.

Design of Robust Optimal Control System for Bank-to-Turn Missile

90FE0047A Harbin HARBIN GONGYE DAXUE
XUEBAO [JOURNAL OF HARBIN INSTITUTE OF
TECHNOLOGY] in Chinese No 1, Feb 90 (MS received
Oct 88) pp 54-59, 40

Article by Cui Pingyuan [1508 1627 6678], Yang Di
[2799 3321] and Wu Yaohua [0702 3852 5478] of the
Space Institute]

[Excerpts] Abstract

In this article, the problem of robustness in the design of an optimal control system for a bank-to-turn (BTT) missile is discussed. A design approach which uses the symmetric root locus method to determine the weighting matrix of a quadratic performance index is introduced. The effectiveness of this method is demonstrated by an example of designing a robust optimal control system for a particular type of BTT missile.

Introduction

In an effort to achieve maximum maneuvering during the search process of a tactical missile, research has been conducted to study the possibility of switching from Skid-to-Turn (STT) control to Bank-to-Turn (BTT) control. The design of an STT control system is based on the assumption that all three control channels are independent. However, in the design of a BTT control system, this assumption is no longer valid because of the effects of dynamic coupling, inertial coupling, and coupling between control forces. Instead, one must apply the theory and techniques for designing a multi-variable system.

In the theory of multi-variable system design, the method of optimal control system with a quadratic performance index is a very effective approach for designing MI/MO [multiple-input/multiple-output] systems. However, its optimality is based on the condition of the deterministic control object. If the control object contains non-deterministic elements or if it is time-varying, then such a control system will not be optimal, and it is possible that instability may occur. Therefore, the robustness of an optimal control system with realistic control object is an important problem that must be addressed. In Ref. [1], Bryson has pointed out that the performance and robustness of an optimal control system are two conflicting system requirements; e.g., reducing the performance requirement of a control system can increase its robustness. The key to determining the performance and robustness of an optimal control system is the selection of the weighting matrix of the performance index. The existing methods used for selecting the weighting matrix are mostly empirical. However, by using the Hamiltonian operator matrix, it is possible to derive a characteristic polynomial with symmetric eigenvalues; the negative real eigenvalues of the polynomial are the poles of the optimal control system. Therefore, by properly selecting the eigenvalues of the Hamiltonian operator matrix, one can obtain an optimal control system which is a compromise between

the performance and robustness requirements. In this article, the Hamiltonian operator matrix is used to derive a direct relationship between the poles of the optimal control system and the weighting matrix of the performance index. This relationship is used to design the control system of a particular type of BTT missile, and the design results for the robust BTT missile are presented.

1. BTT Control Technique

BTT control is a new control technique for an automatic homing missile; in contrast to the STT control technique, which independently controls the acceleration components in two orthogonal planes, BTT control takes advantage of the roll motion of the missile to ensure that the required normal overload always falls on the effective lift surface, thereby greatly improving the maneuverability of the missile. However, designing a BTT control system involves finding the solution of a multi-variable coupled system, and the most important problem in the implementation of BTT control is to ensure the controllability and stability of the missile. In addition, BTT control also requires a coordinated control system whose function is to ensure that the missile maintains approximately zero skid angle during flight. To achieve good performance of a BTT missile requires a sufficiently large roll angular velocity; but large roll velocity has an adverse effect on the stability of the guidance circuit of a radio guidance system. Therefore, another problem that must be addressed in BTT control is to suppress the effect of missile roll motion on the stability of the guidance circuit. While BTT control is a promising approach for improving the performance of a tactical missile, the decoupling methods used in the design of an STT control system are no longer applicable. In this article, an effective approach which uses the symmetric root locus method to determine the weighting matrix of a quadratic performance index is introduced. This method is illustrated by an example of designing the control system for the pitch and yaw channels of a particular type of BTT missile.

2. Symmetric Root Locus Method for Determining the Weighting Matrix of Quadratic Performance Index

By finding the eigenvalues of the Hamiltonian operator matrix based on the MacFarlane-Potter-Fath method, it is possible to derive a direct relationship between the weighting matrix of the performance index and the poles of the closed-loop control system. On the basis of this relationship, the root locus of the closed-loop control system can be used to determine the weighting matrix. [passage omitted]

3. The root locus of the control system is computed in terms of the variable parameter A/B using the computer program OPTSYS, which calculates the eigenvalues of the Hamiltonian operator matrix. A plot of the root locus is shown in Figure 1.

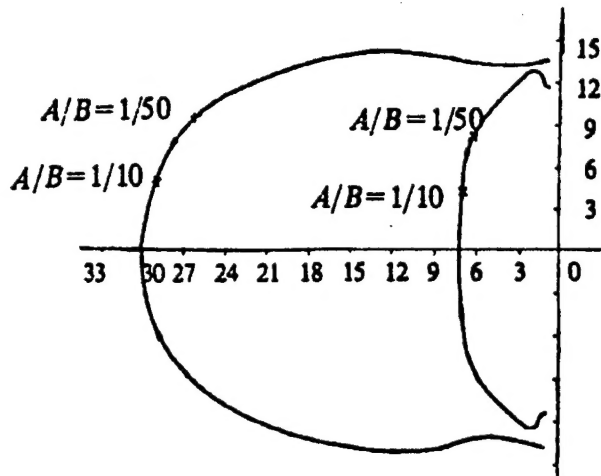


Fig. 1. Root Locus of the Optimal Control System With A/B as a Variable Parameter ($\omega_x = 1$)

As shown in Fig. 1, good performance of the optimal control system can be achieved by choosing a value of A/B in the range $1/50$ - $1/10$. Fig. 2 and Fig. 3 show the root locus of the optimal control system for the pitch and yaw channels when ω_x varies from 0 to 5 rad/sec with A/B equal to $1/50$ and $1/10$ respectively. It can be seen from these figures that the control-system design based on the selected A/B values has strong robustness with respect to ω_x ; therefore, this design would be effective for a practical BTT missile control system.

4. Conclusion

In the design of a multi-variable control system, if the design criterion is based on a classical performance

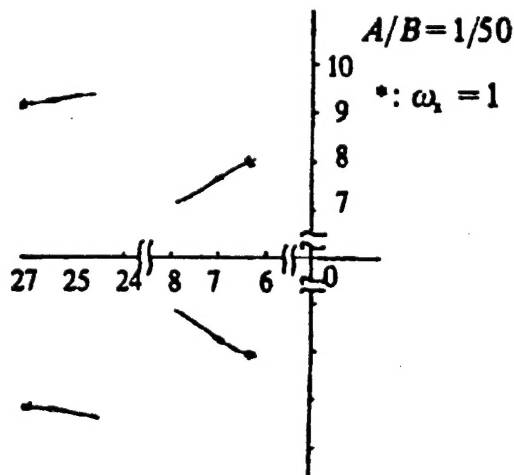


Fig. 2 Root Locus of the Optimal Control System as a Function of ω_x (ω_x varies from 0 to 5 rad/sec) $A/B = 1/50$

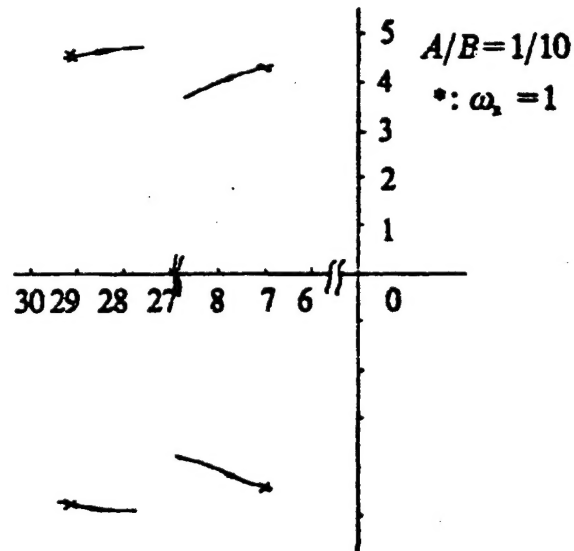


Fig. 3 Root Locus of the Optimal Control System as a Function of ω_x (ω_x varies from 0 to 5 rad/sec) $A/B = 1/10$

index, not only is the problem more difficult, but the design should also be more complicated. The use of a quadratic performance index for designing a multi-variable control system is convenient and feasible, but selecting the weighting matrix for the performance index has been a difficult problem. In this article, the symmetric root locus method for determining the weighting matrix is proposed, and the method is illustrated in the design of a robust optimal control system for a BTT missile. From this example, it is concluded that the proposed method is simple and effective, particularly when the control object is a time-varying aircraft.

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Frozen Orbit With Its Application

40090014a Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, Jan 90 pp 23-32

[English abstract of article by Yang Weilian [2799 4850 1670] of the Chinese Academy of Space Technology]

[Text] In earth observation satellite system design, the frozen orbit has been playing an increasingly important role recently. This is because it can provide a satellite (as a mass point) with the same dynamic conditions when the satellite passes through the same latitudes at different times, so that remote-sensing images of the same areas taken at different times have the same geometric features. In this paper, the conditions and features of the frozen orbit are studied in detail, along with its applications.

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On Radiation Field of Radial Antenna Array Around Spherical Antenna

40090014b Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, Jan 90 pp 33-38

[English abstract of article by Wang Jueqi [3769 3635 7496] and Yi Li [2496 0500] of the Institute of Spacecraft System Engineering, Chinese Academy of Space Technology]

[Text] Expressions for linearly and circularly polarized components of a radiation field from a radial antenna placed in an arbitrary position on a spherical satellite have been derived. Computations are performed for the radiation field of inclined and horizontal four-element arrays with turnstile excitation, and some typical patterns are shown. The effect of the sphere radius and antenna length on the patterns, the field structure requirements for an earth-station antenna and, finally, the difference between radiation patterns for antennas on spheres and cylinders are discussed.

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Local Accuracy of Mean-Absolute-Difference Image-Matching System

40090014c Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, Jan 90 pp 54-62

[English abstract of article by Lin Jinming [2651 6855 2494] of Beijing Information Engineering Institute; Peng Jiaxiong [1756 0857 7160] of the Central China Science and Engineering University]

[Text] Two basic theorems are proved in this paper. Assuming the image signal and the superposed noise are mutually independent homogeneous Gaussian random fields with zero mean and both are (twice) differentiable, the analysis and computation methods of the local accuracy of mean-absolute-difference image-matching systems are solved. The theoretical basis and quantitative analysis method are provided for matching performance. The factors and parameters affecting the local accuracy are illustrated by examples.

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Application of Singular Optimal Regulator Design of High-Speed Control in Missile Control Engineering

40090014d Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, Jan 90 pp 70-76

[English abstract of article by Luo Zhiying [5012 2535 5391] of Beijing Department of Precision Machinery Overall Design]

[Text] Based on the theory of singular optimal control, the equivalence of the singular state of high-speed control and linear optimal control is studied for use in solving practical problems related to missile control engineering.

This paper has solved a difficult design problem involving the selection of the required imperative transform when missile Bang-Bang control (BBC) is used in the singular region. This new design method in which singular optimal control is combined with high-speed control—two-mode control—will reduce the sensitivity and improve the robustness of the system.

System simulations of this method by means of CSCAD produce satisfactory results.

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Stability Robustness Analysis of Attitude-Control System of Flexible Spacecraft in Time Domain

40090014e Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 1, Jan 90 pp 77-83

[English abstract of article by Xu Shijie [1776 0013 2638] and Wu Yaohua [0702 3852 5478] of Harbin Institute of Technology]

[Text] The stability robustness of the attitude-control system of a flexible spacecraft in the time domain is investigated. As a result of the effect of solar array rotation and the variation in the rotating speed of the momentum wheels, there is uncertainty in the mathematical model of the system. The uncertainty may be solved by the perturbation method for the motion equations of the dynamic system. The stability robustness criterion in the time domain is given. A numerical example shows the application of this method.

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Satellite Attitude Determination with Star Image Data

40090014f Beijing YUHAN XUEBAO [JOURNAL OF CHINESE SOCIETY OF ASTRONAUTICS]
in Chinese No 1, Jan 90 pp 91-98

[English abstract of article by Guo Zhaozeng [6753 0340 2582], Lu Yunxiang [7120 0061 4382] et al., of Beijing Institute of Satellite Information Engineering]

[Text] The formula and calculation methods for satellite attitude determination using star image data are presented in this paper. The star image is photographed by a camera mounted on the satellite. This method has been successfully used in many practical applications.

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Genetic Toxicity of Petrochemical Sewage on Adult, Pregnant Mice, Their Fetuses

40091010a Beijing BEIJING DAXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS PEKINENSIS] in Chinese Vol 26 No 2, Mar 90 pp 219-224

[English abstract of article by Ma Jixia [7456 4949 7209], Zhao Chao [6392 6389] and Wang Xinli [3769 2450 0500] of the Department of Biology]

[Text] In order to exploit cheap irrigation water resources for farmland utilization, the utilization of urban waste water has been developed during recent years, although nearly 85 percent of the urban industrial waste water, e.g., petrochemical sewage, has not been thoroughly purified before being drained to the irrigation system.

In this study, adult mice, pregnant mice and their fetuses were treated with petrochemical sewage J, reservoir water N and tap water S to investigate the genetic toxicity. The results showed that in adult mice, there were no significant differences in micronucleus frequency between the S, N and control groups. However, the pregnant mice and fetuses exhibited some mutagenic activity. After treatment, there was a very significant difference ($P < 0.001$) between the control and J groups.

The magnitude sequence of the mutagenic activity of the different water types is petrochemical sewage > reservoir water > tap water. The magnitude sequence of animal sensitivity to the toxic effect is fetal mice > pregnant mice > adults.

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Genetic Toxicity of Petrochemical Sewage on Mouse Sex Cells, Somatic Cells

40091010b Beijing BEIJING DAXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS PEKINENSIS] in Chinese Vol 26 No 2, Mar 90 pp 225-231

[English abstract of article by Ma Jixia [7456 4949 7209], Li Ziyu [2621 1311 3768] and Xu Xu [6079 2485] of the Department of Biology]

[Text] By means of the sister chromatid exchange method (SCE), chromosomal aberration of bone marrow cells and terato sperm tests, the genetic toxicity of petrochemical sewage has been evaluated in mice. The results showed that: (1) Comparing the SCE frequency between the effects of petrochemical contaminative N from reservoir water J and control tap water S, there were no significant statistical differences ($P < 0.05$). (2) Chromosomal aberrations: The mice treated with S for three durations (7, 14 and 28 days) and with N and J for two durations (7 and 14 days) exhibited no significant chromosomal aberrations ($P > 0.05$), however, in the 28-day group treated with N and J, aberrations were markedly significant compared with those of the control ($P < 0.01$, $P < 0.001$). (3) In the mice treated with S, N and J for 28 days, the percentage of terato sperm was significant in all groups other than the control ($P < 0.01-0.001$). This shows that the genetic toxicity of S, N and J is time dependent, and that sperm cells are more sensitive to their toxic effect than are somatic cells.

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Detection of Structural Proteins of Epidemic Hemorrhagic Fever Virus, Dynamics of Its Production in Vero-E6 Cells

40091010c Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 10 No 1, Feb 90 pp 39-42

[English abstract of article by Liang Mifang [2733 4717 5364], Hang Changshou [2635 7022 1108], et al., of the Institute of Virology, Chinese Academy of Preventive Medicine, Beijing]

[Text] The structural proteins of epidemic hemorrhagic fever virus (EHFV) and the dynamics of its production in Vero-E6 cells infected with EHFV strain L99 were studied by IFAT [Indirect Fluorescence Assay Technique] and sandwich ELISA using monoclonal antibodies to G2 glycoprotein and nucleocapsid protein (NP), respectively. It has been observed that the quantity of G2 glycoprotein in the infected Vero-E6 cells is much greater than that in infected cell culture fluids, the quantity of NP is much higher than that of G2 glycoprotein in infected culture fluids, and that the peak of NP produced in the infected E6 cells appeared earlier than that of G2, with the former appearing 3-4 days postinfection and latter 6-8 days postinfection. The viral multiplication in Vero-E6 cells reached a peak infectious titer 6 days after infection. The multiplication of EHFV seemed to be associated with its glycoprotein synthesis within the infected cells. This data would be useful in the development of an inactivated vaccine against the EHF virus.

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Antigen Heterogeneity Among Six *Coxiella burnetii* Strains in SDS-PAGE, Immunoblotting Assay with Monoclonal Antibodies

40091010d Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 10 No 1, Feb 90 pp 43-46

[English abstract of article by Wen Bohai [3306 0590 3189], Yu Shurong [0205 2885 2837], et al., of the Department of Microbiology, Third Military Medical University, Chongqing]

[Text] The purified whole cell antigens of six *Coxiella burnetii* strains were subjected to SDS-PAGE, and approximately 50 bands were observed in the migrating profile of each strain: a 95.6 KD band was unique and a 13.5 KD band was absent for the Grita strain obtained from the Soviet Union, while a 33.5 KD band was distinct for the Henzerling strain isolated in Italy. The antigen fractions transferred from SDS-PAGE gel to nitrocellulose paper were determined by immunoblotting assay with monoclonal antibody (phase I, B8) to *C. burnetii*. Positive bands appeared in the profiles for every strain except the Grita strain, while three bands (35.5, 37.2 and 19.1 KD) were unique for the Henzerling strain and bands lower than 67 KD were absent for the YS 8 strain isolated in Yunnan Province. The profiles for the Qi Yi, Ya An and Xin Qiao strains isolated in Sichuan Province were very similar to each other.

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SFG [Spotted Fever Group] Rickettsia Strain JH-74-Induced Cellular Injuries of MERN *In Vitro*, Cells of Yolk Sac of Chicken Embryo *In Vivo*
40091010e Beijing ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINESE JOURNAL OF MICROBIOLOGY AND IMMUNOLOGY] in Chinese Vol 10 No 1, Feb 90 pp 62-64

[English abstract of article by Wang Fusheng [3769 4395 3932], Wang Hongxia [3769 1347 7209], et al., of the Institute of Microbiology and Epidemiology, Academy of Military Medical Sciences, Beijing]

[Text] The infection of the Jinghe strain of Rickettsia sinkiangensis in MERN, as well as in the chicken embryo yolk sac, was studied by transmission electron microscopy at different intervals following infection. The following cytopathological changes were observed: Dilation of the rough endoplasmic reticulum (RER) and outer nuclear envelope, accumulation of a fine granular electron-dense material in the cisternae of RER, the formation of immense cytoplasmic vacuoles, nuclear destruction and host cell lysis. During the late stage of infection, the organism exhibited signs of degeneration, dwindling in its shape, plasmolysis and a sinuous cell wall with occasional breaks. The possible mechanisms of cell injuries induced by the organism are discussed.

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Purification, Properties of Hypotensive Component of Agkistrodon Halys Ussuriensis Venom

40091010g Hefei ZHONGGUO KEXUE JISHU DAXUE XUEBAO [JOURNAL OF CHINA UNIVERSITY OF SCIENCE AND TECHNOLOGY] in Chinese Vol 20 No 1, Mar 90 pp 104-109

[English abstract of article by Wang Chun [3769 3196] et al., of the Department of Biology, University of Science and Technology of China; Qin Gongping [6009 0361 1627] of Hospital No 238, PLA]

[Text] A hypotensive component (HTC) has been isolated and purified from Agkistrodon Halys ussuriensis venom by means of DEAF-Sephadex A-50 and Sephadex G-75 chromatography. HTC has been proven to be homogeneous by polyacrylamide gel disk electrophoresis. Its molecular weight is 17500 by SDS-PAGE and its isoelectric point is pH 6.6. Biochemical analysis has shown that the HTC does not contain saccharide. HTC exhibits neither proteolytic enzyme, L-amino oxidase nor phospholipase A₂ activities, nor does it exhibit hemorrhagic, fibrinolytic anticoagulant, thrombin-like or lethal activities, while it does demonstrate arginine ester hydrolase activities.

An distinct decrease in blood pressure in rabbits after iv HTC 0.1 mg/kg was observed. The HTC caused a rapid decrease in blood pressure, from 98 mm Hg to 40 mm Hg, but it returned to close to its original value after a few minutes.

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Computer Network Developments Reported**High-Speed Transmission Network Certified**

90CF0305 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 50, 27 Dec 89 p 1

[Article by Han Yun [7281 0061]: "The Development of a High-Speed (56Kbps) Transmission Network"]

[Text] Item 04 of the "Mid-Range Numerical Weather Forecast" project among the key scientific and technical projects of the Seventh 5-Year Plan, allocated by the State Planning Commission and the State Science and Technology Commission, is the "Development of a High-Speed (56Kbps) Transmission Network" (B-Topnet for short), which has now been successfully completed by the Beijing University Computer Department and Radio Department. This achievement passed its technical evaluation recently in Beijing, as sponsored by the State Meteorological Administration Office of Science Teaching.

It was planned that the Mid-Range Numerical Weather Forecast System would be implemented on a functionally dispersed, complex distributed computing system made up of a supercomputer and several mainframes and superminicomputers, where all computers would be connected via a high-speed (50Mbps) LAN. The project that was item 04 was divided into two sub-projects: development of a high-speed baseband digital transmitter that can transmit data along multiple paths using common telephone cable, and of high-speed synchronous interface software and hardware, with a network.

During development of the base-band digital transmitter and in order to use existing telephone cable for digital communications, development personnel did equalized amplification of the received signal and carefully designed rate selection, code-form selection, and framing, by which they solved problems whereby waveforms could not be recognized due to the insufficient transmission frequency of wire, and by which they satisfied the demands of the key tasking in this project.

During development of the high-speed interfacing software and hardware and the network, data conversion for the host machine was done through a bidirectional-switching-mode data buffer, for which was used the appropriate S-100 bus, and which improved the portability of the network interface boards while allowing the software and hardware designs to be simple, the data conversions to be fast, and providing high reliability.

B-Topnet is an OSI [Open Systems Interconnection] standard network system designed and developed in China for a Unix environment. The success with this project demonstrates that China now has the initial development technology by which to accomplish an OSI standard network and the capability to design and develop our own OSI network.

The B-Topnet network system provides users with file transmission and storage management services under the Unix environment and implemented under the TOP [technical and office protocol] network protocol standard, which is then suitable for use by service organization units and on campuses within a radius of several km.

Ethernet Expansion System Developed

90CF0305 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 2, 10 Jan 90 p 22

[Article by He Qingrong [6320 1987 2937]: "Southwest Jiaotong University Completes Development of the 'Ethernet Expansion System'"]

[Text] The current trend in the development of LANs in developed nations is to connect several LANs together, and network connections and circuits can grow rapidly under programmed control. Network connective products from several companies debut continually, but there is no standardization for particular types of equipment, which inhibits their general use. To meet the urgent need in China, Southwest Jiaotong University imported several of these networks, and by the transformation and development of existing equipment, they have completed the network interconnection hardware and software, have implemented network interconnectivity, and have provided beneficial experience with network systems construction, network performance analysis, and the selection of network type. The "Ethernet Expansion System" they have achieved has such features as: Ethernet point-to-point real-time communications, interconnectivity between Ethernet and DECnet, and interconnectivity between Ethernet and Omninet; a newly developed multiple interconnectivity processor (MIP); resolution of the problem of insufficient memory for running Sinicized dBASE III; output of Chinese characters from shared printers that are without Chinese-character cards and from shared plotters on 3+ networks; analysis of 3+ Ethernet performance; and research on network system construction and design methods.

The "Ethernet Expansion System" is made up of three parts, which constitute a complete multi-network interconnection system implemented through various means. A user can choose a complete cubic structure, or he can choose any subset he wants. The three parts are:

1. A multipurpose interconnection processor (MIP), developed from an STD bus, that connects Ethernet, Omninet, and DECnet through the MIP interface to an Ethernet network, and that links remote microcomputers over telephone lines into this multi-network system. Within the context of this multi-network system, any two stations can undertake real-time point-to-point communications.

2. Software used to interconnect the computer networks and to accomplish the point-to-point communications.

Using direct interconnections, 3+ Ethernet can be directly connected with DECnet through cable connectors, and interconnection software was developed on PC workstations on 3+ Ethernet networks according to DECnet protocols, through which was achieved 3+ Ethernet to DECnet-Ethernet interconnection. The key to this success in analyzing and understanding the DECnet network protocol, where without any modification to DECnet itself, the interconnection software was developed only for PCs. The system uses a virtual terminal server: any PC workstation on the 3+ network can be a virtual terminal on any node of a VAX-hosted network and can share the resources and service of the VAX host. It uses remote files to access the server: this allows any PC workstation on a 3+ network to dynamically access disk files on any node of a VAX DECnet network. 3+ networks can similarly access the disk files of other PCs. It uses files to access a receiving server: this allows VAX terminal users on any node of DECnet to initiate access of disk files or any PC workstation on the 3+ network. Using an IBM PC microcomputer as a signal switch, this system point-to-point real-time communications between Omninet and Ethernet. For PCs to do signal switch initiation, protocol conversions and virtual terminal servers had to be resolved first.

3. A system which resolves problems with insufficient memory when Chinese-character dBASE III is run on IBM PC XTs after loading the 3+ network drivers and CCDOS. In so doing, this system has accomplished the output of Chinese characters from printers without Chinese-character cards.

This achievement can be used for the interconnection of computer networks belonging to state organizations and to units of service organizations, expanding the scope of network communications and allowing the exchange of data between different networks. On this basis, more flexible and effective management information systems and office automation systems can be built. At present, this software is already being used by such units as the Sichuan Province Bureau of Petroleum Management, the Chengdu Railway Bureau, and the Shijiazhuang Railroad Academy, with excellent results. In 1989, this achievement was recommended for a grade-2 award by the Computer Professionals for Sichuan Province Awards for Scientific and Technical Achievements.

Data Encryption and Access Control Systems

90CF0305 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 3, 17 Jan 90 p 1

[Article by Gao Lihua [7559 7787 5478]: "Security Guard for Network Transmission and Financial Computers: Data Encryptors and Microcomputer Access Control Systems Appear"]

[Text] Two sub-projects in the CIMS [computer integrated manufacturing systems] project (511-03-01) of the

national 863 Plan—a data encryptor and a microcomputer access-control system—passed their technical evaluations held by the Jiangsu Province Science and Technology Commission on 27 December 1989. These two projects were judged to have achieved advanced domestic levels and to have filled domestic voids in such aspects as algorithm-change modes, encryption-key insertion modes, and in implementing effective control of general-purpose microcomputers.

The Data Encryption Engine (DEE) was developed by computer communications technology specialist Professor Gu Kuanqun [7357 1401 5028]. Vice Provost of Southeast University. Faced with the phenomenon of "leaking" of computer network data during the transmission process, he changed transmitted data from clear text to encrypted code, by which he accomplished his goal of secure transmission. DEE complies with the international OSI reference model, thereby being general-purpose and standard, and which makes it suitable for such fields as finance, public security, the military, and office automation. It is characterized by using software in place of hardware for the encryption algorithms, so the user may change algorithms at will. This lengthens the application period of the encryptor, enhances security, and creates the conditions for batch production. The extrapolated encryption-key mode also improves security.

The microcomputer access-control system is primarily designed to counter the problem of computer crime in financial circles. It makes use of a "key-like" system, and by password protection and control of time on-line, it gives management personnel the capability to control illegal computer operations. Its strength is in using the expansion functions of the microcomputer itself, so that it is not necessary to modify the structure of an existing system. This makes it quite compatible.

These two achievements have been successfully tested in the Office of Public Security in Jiangsu Province and at the Province Bank of Industry and Commerce.

New Compilers, AI Systems Described

First Chinese Pascal Compiler for Mainframes

90CF0304 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 46, 29 Nov 89 p 19

[Article by Liu Zhuo [2621 3820]: "China's First Pascal Compiler System for Mainframe Computers"]

[Text] On 17 October 1989, the Computer Department of the Ministry of Machine-Building and Electronics Industry convened an experts' evaluation committee for the ECI Pascal Computer System.

ECI Pascal is a Pascal compiler system developed by the East China Computer Institute to compile and execute Pascal on IBM or compatible mainframes (VM/CMS). It is compatible in user interface with IBM Pascal/VS (standard level), and it is the first domestically-developed language to be implemented on IBM mainframes.

After careful consideration by participants, the unanimous opinion was that the ECI Pascal compiler system developed by the East China Institute of Computer Technology is the first language compiler system developed in China that can run on IBM mainframes; it is the first compiler in China to pass the Pascal Verification Sequence (PVS) rigorous verification developed by the British Institute of Standards; and the ECI Pascal compiler has advanced means of development, as well as being quite consistent, maintainable, and reliable. Its successful development is a delightful achievement for the Chinese production of software for mainframe computer systems.

AI Logical System Developed

90CF0304 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 48, 13 Dec 89 p 1

[Article by Hu Yunfa [5170 6663 4099]: "High-Performance Logical Language Integrated With Its Environment Receives High Acclaim From Experts"]

[Text] The Logical Language and Environment Integrated System, developed by the University of Science & Technology for National Defense (USTND) on a Yinhe ["Galaxy"] superminicomputer, is an intermediate product from the key state project called "intelligent computer-based language and environment," and it has now passed its technical evaluation by experts. The experts who took part in the evaluation unanimously recognized that during work on this project, the Computer Department of USTND had come up with an innovative achievement.

1. This system uses static procedural semantics, as well as the techniques of dynamic compiling and dynamic allocation, to fundamentally resolve problems with compilations of great difficulty and interpretation compatibility. This achievement is unique.

2. This system introduces a new heuristic HWAM model that is innovative theoretically and implements that theory in practice. Comparing this model with the well-known WAM model of national defense, we find its performance better and that it is more efficient.

3. By using advanced partial-sum-computation and program-conversion techniques to optimize the Prolog source code, they have developed a partial calculator of outstanding performance. This is the first time within China that a mature and effective partial-sum calculator with unique heuristic data extraction has achieved a level of practical use.

4. Design and implementation of 3-level optimized compiler techniques—source to source, source to heuristic HWAM abstract machine, and abstract machine to host machine—greatly improves compiler efficiency and the efficiency of compiled execution. For example, compiler efficiency is clearly greater than the SEPIA system of the European Computer Industry Research

Center [?ESPRIT], and execution efficiency is distinctly greater than the internationally known commercial system Quintus.

5. This system is based on windowing subroutines, in which are integrated a syntax-guided editor, an expanded interpreter system, an effective compiler system, and a mature partial calculator, all organically integrated with the operating system, a database system, a graphics library system, and a Chinese-character system to create a very friendly user interface and development environment.

Synthesis of the techniques just described allows the GKD-Prolog/WICK to become a functionally powerful, efficient, and convenient integrated environment system with innovative logical program design. This is the first system of its kind developed in China, and its performance exceeds an advanced domestic level and meets the international state-of-the-art.

This system can be widely used in such new teaching and research disciplines as artificial intelligence, knowledge engineering, and expert systems, and it will have a positive stimulating effect on the theory and practice of developing the new generation of computer systems.

After the evaluation, many fellow units from such places as the Beijing Joint Institute of High Technology and Shanghai's Fudan University sent people to request the transfer of rights to software. It is said that the USTND Computer Department has decided to market this system.

Knowledge Acquisition System Developed

90CF0304 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 1, 3 Jan 90 p 16

[Article by Wu Changsheng [0702 7022 4141]: "The University of Science and Technology for National Defense Promotes Knowledge Acquisition System"]

[Text] The GKD-NKAS Knowledge Acquisition System, developed by Computer Department of the University of Science & Technology for National Defense, recently passed its technical evaluation in Changsha.

The GKD-NKAS Knowledge Acquisition System is a knowledge-acquisition system designed and implemented using GKD-Prolog on VAX 11/780 or Micro VAX II computers. The experts concluded that in comparison with such existing domestic and foreign advanced knowledge-acquisition systems as the Meta-Dendral System, Winston's Structured Learning System, and the AQ11 and AQ15 from R.S. Michalski et al, as well as GPMIL from the Chinese Academy of Sciences

(CAS) Mathematics Institute and the ZEAT system from Zhejiang University, the GKD-NKAS system has the following unique features:

1. This system differs from those knowledge-acquisition tools just mentioned in not only providing for self-acquisition of knowledge having discrete attributes, but also in providing a capability for automatic acquisition of knowledge having connected attributes, consequently broadening the scope of knowledge acquisition and fields of real application.
2. This system is the first domestically to promote a system applying the combined techniques of inductive-based learning and deductive-based non-monotonic inference to learning—a system which at the same time can update and continuously improve knowledge bases through inductive learning brought in through non-monotonic inference.
3. This system has introduced a user-friendly interface for the evaluation of acquired knowledge, and it has provided manual and automatic refinement techniques, by which to better insure the accuracy of acquired knowledge.

New Cross-Compiler Developed

90CF0304 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 3, 17 Jan 90 p 1

[Article by Zhang Xiuying [1728 4423 5391]: "Large-Scale Copyright Ada Compiler System Software Debuts in Beijing"]

[Text] The BISE Ada VAX/GW Cross-Compiler System—a key research project for large-scale software during China's Seventh 5-Year Plan, was recently successfully developed by the Beijing Institute of Systems Engineering, where it passed an evaluation sponsored by the State Commission of Science, Technology and Industry for National Defense.

BISE Ada is an Ada cross-compiler that uses VAX/VMS as a host environment and where the target environment is the domestically manufactured GW286/DOS. The compiler system includes four parts: the Ada cross-compiler, an Ada linker, librated routines, and a run-time module.

This system uses a system made up of a DDC-Ada compiler front-end and a separately developed back-end and run-time for the target machine: this has successfully resolved the technical difficulties in using such limited hardware resources and software support as come with a microcomputer, and it has transformed the VAX into a cross-compiler system for the "Great Wall" 286. In its breakthroughs in such aspects as the microcomputer 64K addressing limits, memory management, optimized code, server management, and exception handling, this project has adopted several measures by which to improve quality, as for example in the scheme whereby the code generator directly generates machine code, and where the DOS Linker is able to pack.

The evaluation committee concludes that "the BISE Ada VAX/GW Cross-Compiler System" is the first successful domestically produced compiler system that is also the first to pass the ACVC (international standards testing software package) testing for compliance with language standards, and it is also the first Ada compiler system software product copyright by China that has been developed on domestically produced computers that are hardware-compatible internationally. In terms of technology, this system meets standards for similar international products of the mid-1980s.

Software Developments Reported

Russian-Chinese Computer Translation

90CF0180 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 45, 22 Nov 89 p 1

[Unattributed article: "Successful Development of a Russian-Chinese Microcomputer Translation System"]

[Text] After developing a new generation of English-Chinese microcomputer translation systems, the Machine Translation Branch of the Software Institute (a company) of the Chinese Academy of Sciences has now successfully developed a Russian-Chinese machine translation system. This is the first Russian-Chinese machine translation system developed in China during recent years that has been made available to users.

This Russian-Chinese microcomputer system requires a microcomputer with one megabyte of RAM, which amount would consist of 640K of RAM, 483K bytes of which is available. The system can easily be ported to common AT-class or 286-class computers. The Russian-Chinese editing system used by this Russian-Chinese system was also developed by this institute, and it can conveniently and effectively use the common English-language keyboard to enter and output Russian and Chinese, as well as for running the various common editing functions.

All software for this Russian-Chinese translation system was written in C; the translation (target) program takes 184K bytes, and there are a number of other service and support routines. The Russian-Chinese grammar table includes more than 3,000 formal grammar rules, which makes it one of the world's largest and most comprehensive Russian-language formal grammar tables at present. The grammar table uses a unique descriptive language for ease in expressing any common Russian grammatical phenomena, and it can reflect disparities in Russian grammar. The entire grammar table takes up 360K bytes. In addition to the grammar table, the system also contains a Russian-language morphology table, which is used to handle complex Russian suffix changes. The Russian-Chinese dictionary of machinery that is currently installed in the computer has more than 20,000

Russian phrases (the majority of which are root forms), and among the dictionary data are grammatical information, vocabulary meanings, common phrases, and various idioms. The dictionary information is quite plentiful and means of expression are flexible and easy, which aids in improving and expanding the dictionary. Both the grammar table and the machinery dictionary have special software for management and maintenance.

This system has now undergone a great deal of translation testing, and when the dictionary has been well debugged, the quality of translation can be as high as 80 percent. When a translation is not good, improvement can be attained through adjustment and rectification via dictionary information. The user can integrate his own needs and the characteristics of his documents, and an even higher translation success rate can be achieved through secondary dictionary development. The Russian-Chinese machine translation system is still being improved, and it will soon be available in an improved version, when it will be released to the market for use by the public.

Knowledge Engineering System

90CF0180 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 45, 22 Nov 89 p 2

[Article by Lu Zhihong [7120 1807 7703]: "Wuhan University Develops a 'Knowledge Engineering Software Environment' System"]

[Text] The operator pressed keys on the computer and color drawings were immediately displayed on the screen, containing such expert operations inferences as planning, management, guidebooks and medicine, and eliciting endless praise from more than 20 computer professors and experts who had come from all over China. Experts who were part of the state Seventh 5-Year Plan key science and technology project "Knowledge Engineering Software Environment" evaluation committee that was convened on 30 October by the Hubei Province Committee concluded that in this system the representation of knowledge is generous, that inference control is flexible, and that the scope of application is broad; that it is the first such system developed in China; and that it has achieved an advanced level equivalent to an international level of the 1980s.

This project was accomplished by four graduate and undergraduate students approximately 24 years of age, and led by 37-year-old Assistant Professor Li Weihua [2621 5898 5478] of the Department of Computer Science at Wuhan University. To develop a knowledge engineering software environment system appropriate to China's national situation, these people worked tirelessly under arduous conditions for 5 years, more than 10 hours a day, to overcome a series of technical difficulties. With a great deal of analysis, investigation, and study of foreign tools and systems, they creatively proposed completely new concepts and processing techniques such as structural frameworks, non-determinate examples for

structural frameworks, consistency checking, and cyclic inference suppression, by which they have integrated three knowledge description styles popular internationally. They have designed three different inference engines for different conditions, and they have brought all these aspects into a single entity, providing the system with a powerful inference capability and excellent inference environment, with flexible and convenient means of knowledge acquisition, and reliable and secure encryption measures for special users.

Source code for this system includes 28,000 lines of LISP, 12,000 lines of C, and 15,000 lines of virtual assembler. After assembly, the software will run on IBM PC and compatibles with 640K bytes of RAM.

After successful completion of this system, many research and production units from the Chinese Academy of Sciences and dozens of other institutes, ministry commissions, and military units tested it, and some have turned it into practical knowledge systems and expert systems, which serve the national economic construction and national defense effort; from this, significant economic and social results have been obtained. Experts and scholars from such countries and regions as the Soviet Union, Japan, United States, Taiwan and Hong Kong have come to see and buy this software.

VLSI CAD System Announced

90CF0180 Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 45, 22 Nov 89 p 14

[Article by Gao Deyuan [7559 1795 0337]: "NPU VLSI CAD System Can Run on Such Workstations as the Sun, Vax, Apollo, and GPX"]

[Text] The NPU system is a completely custom VLSI CAD system developed by the ASIC [application specific integrated circuit] Lab of the Northwest Polytechnical University Computer Department that passed an evaluation held by the Ministry of Aeronautics & Astronautics Industry (MAAI) on the eve of National Day. Experts and delegates in the committee concluded that this system provides a practical VLSI CAD design system for China's microelectronics industry, that its degree of development and practicality is currently foremost within China, and that it is of a level prevalent internationally during the mid-1980s.

There are nearly 30 tools within the entire software package, extending in size to 60 megabytes. Included among these are: an interactive master-drawing editing and automatic layout software; simulation software; PLA [programmable logic array] design software; PLT program schematic software; and several subroutines comprising input/output format conversion software and library of standard elements. This software basically covers all steps over the entire VLSI design process; it is VLSI design software that has been made quite practical.

The NPU system provides all tools necessary for designing VLSI circuits. These include such things as master-drawing editing, design rules checking, logic simulation, circuit simulation, automatic layout, and PLA design automation. There are also both interactive graphics editing and programmed drawing, by which can be automatically generated as many as 11 types of functional module master drawings; a standard elements library is included, supporting standard element semi-custom design; there is complete plotting software, supporting various plotters, well-designed master drawings are shown in CIF or GDSII formats, which can be output via floppies or tape, and can be made directly available to IC plants.

The NPU system features unique techniques, which are suitable for different kinds of industrial production lines. The NPU system currently supports NMOS and CMOS technologies, and such others as GaAs and SOS [silicon on sapphire] can be developed. In keeping with the requirements of particular technologies, corresponding system files are established in the system. At the production technology facilities of MAAI's Lishan Microelectronics Institute, files have been established for 3-, 4-, and 5-micron NMOS and CMOS technologies.

The NPU system is quite standard for the industry. It runs on the Unix operating system, is easy to port, and is now running on Sun, Vax, Apollo, and GPX workstations or mainframes. The system is quite integrated and it is easy for users to operate. There is communication among all subsystems of the NPU system, they work as a set, and it is organically unified. The user interface is friendly and easy to use.

When the NPU system had been developed, the Northwest Polytechnical University ASIC Lab and Lishan Microelectronics Institute cooperated in using the NPU system to design and verify a bus controller 1553B chip. The chip surface area is 6X7 square mm, has nearly 9,000 transistors, and the layout and design was done in only 3 man-months. After completion of the master-drawing design, the NPU system was used again to do direct logic simulation of the layout; and it did circuit simulation and design rules verification, in which the accuracy of the layout logic and design could be confirmed. Results of its use show that the NPU is a powerful system, very efficient, and is easy to use, which makes it useful for VLSI direct and reserve designs.

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